

### 3.1 Part III - Example 2

**PROBLEM:** Byron received a total of \$700 in cash gifts for graduation and is going to invest the money in a savings account. The Futures Savings and Loan offers a savings account that pays 3.5% APR compounded quarterly. When interest is compounded, it is added to the beginning principal at a specified time, thus forming the new principal to continue growing your earnings. At this rate, what would the balance of Byron's savings account be after five, ten, fifteen, twenty, and fifty years if he does not make any withdraws?

1] How much will Byron have?

<i>t (years)</i>	5	10	15	20	50
<i>A (final amount)</i>					

**PROBLEM:** Since Byron would like to at least double his money, he decides to invest his \$700 for 20 years. But he wants to compare offers from other banks to see if he can get a better deal. All of the banks in his area pay 3.5% interest, but vary in the number of times per year the interest is compounded. Smalltown Bank compounds semiannually, The Futures Savings and Loan compounds quarterly, Pace Credit Union compounds monthly, and Choice Bank of America compounds daily.

2] How much will Byron have?

<i>n (number of compoundings per year)</i>	2	4	12	365
<i>A (final amount)</i>				

3] How much more money will Byron make at Choice Bank of America than Smalltown Bank?

4] How much more money will he make at Choice Bank of America than Pace Credit Union?

**PROBLEM:** National Bank is the only bank in Byron's area that compounds the 3.5% interest continuously. Interest that is compounded continuously always going to produce a greater return.

5] How much more money will Byron earn over 20 years with National Bank compounding interest continuously than with Choice Bank of America compounding daily?

**Pre Calculus Honors**  
**3.1 Homework**

**Name:**  
**Date:**

The Compound Interest Formula is given by:

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

where

P = initial amount of money invested (the “principal”)

r = annual rate of interest

n = number of times

t = time for accrual

A = amount of total money accumulated

1. If \$10,000 is invested at an interest rate of 3% per year, compounded semi-annually, find the value of the investment after the given number of years.

(a) 5 years

(b) 10 years

(c) 15 years

2. The population of Omaha was 618,262 people in 1990. In 2000, the population of Omaha had risen to 716,998 people. Assuming exponential population growth, predict the population of Omaha in the year 2020. Round the result to the nearest person.

3. Graph the following transformations of  $f(x) = e^x$

a.  $f(x) = 2e^{x+3}$

b.  $f(x) = e^{-x} + 2$

4. Transform the parent function  $f(x) = e^x$  by reflecting it over the x-axis, shifting it three space to the right, shifting it two spaces up and stretching it vertically by 2. What is the transformed equation?